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(58) Field of Search

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(54) Abstract Title

Pedal bracket for a vehicle with frangible mounting means

(57) A pedal bracket 10 for mounting one or more control pedals (4 in figure 1) of a vehicle to a pedal box 1 comprises, a base plate 11 for mounting onto a surface of the pedal box, at least one shaft support 20 extending from the base plate to support a shaft 21, a plurality of fasteners 14 provided on or in the base plate, and frangible means 13 engaging with each of the fasteners whereby in the event of a front-end impact of the vehicle the frangible means fracture and the pedal bracket becomes detached from the pedal box. The frangible means may be a plurality of sacrificial areas of the base plate of reduced material thickness with respect to the remainder of the base plate (as shown), or they may be sacrificial bushes surrounding each fastener (see figure 4). The fasteners may be rivets, and the pedal bracket may be formed from various materials. A pyrotechnic charge may be provided to aid detachment of the pedal bracket from the pedal box.

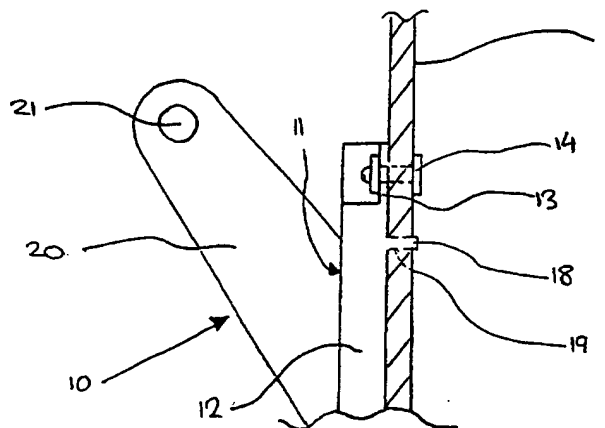


FIG.3

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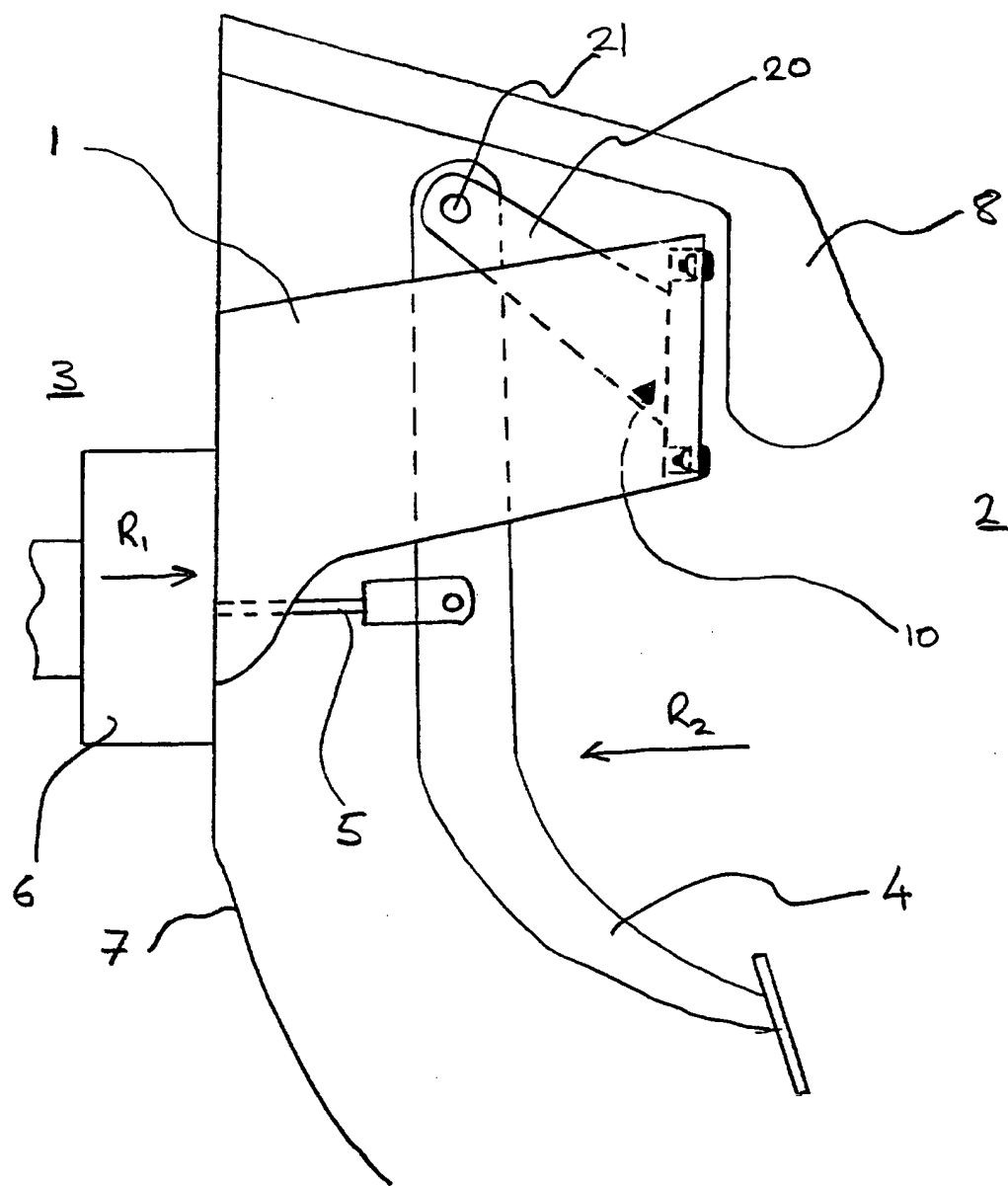


FIG. 1

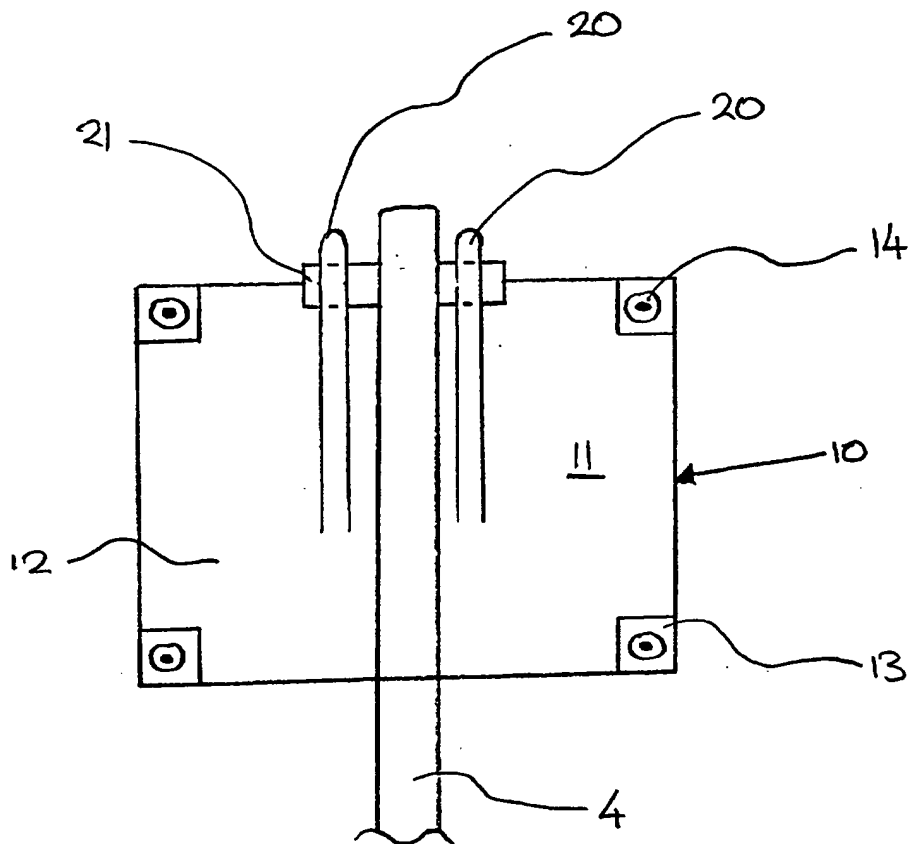


FIG. 2

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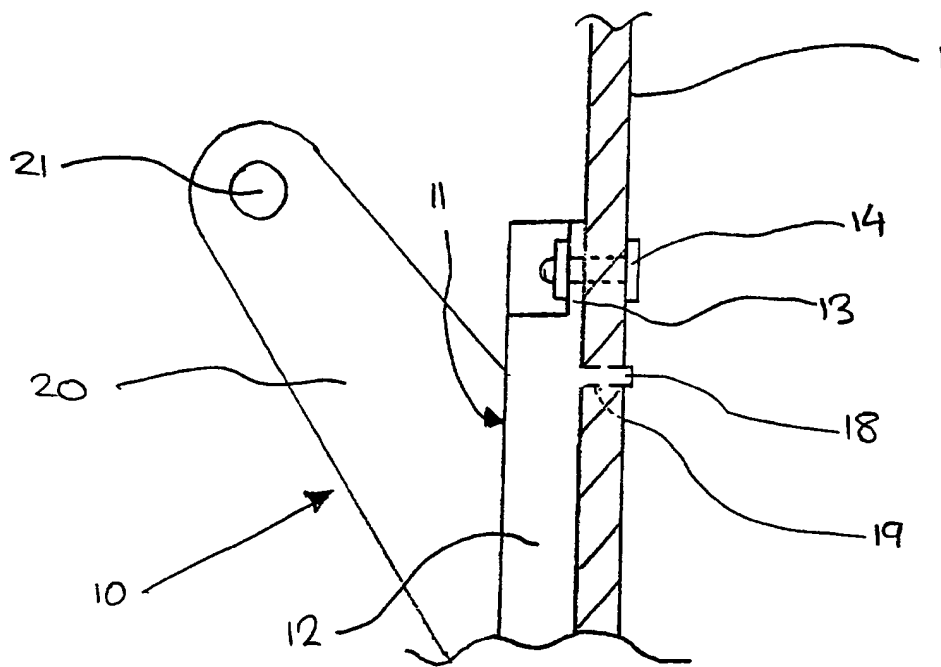


FIG. 3

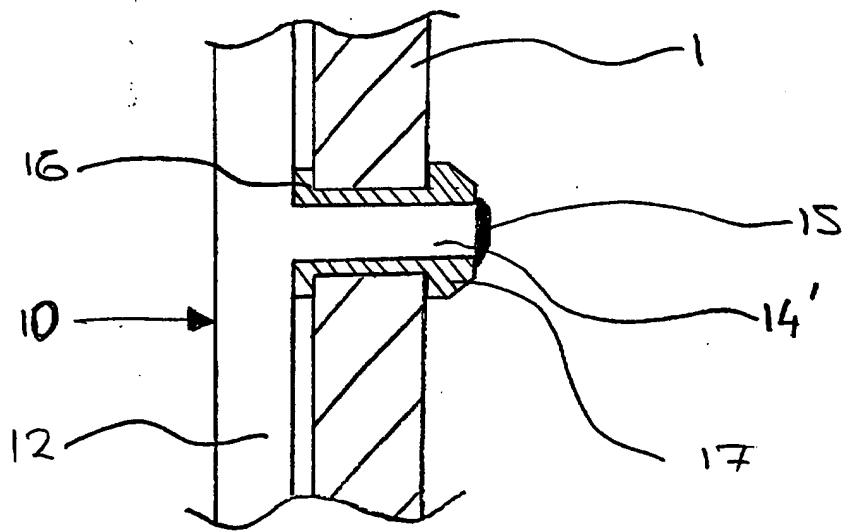


FIG.4

TITLE

Pedal Bracket for a Vehicle

DESCRIPTIONField of the Invention

This invention relates to pedal boxes for automobiles, and to structures which are designed to collapse in the event of a front-end vehicle collision.

Background Art

The improved design of safety shell structures surrounding the driving compartment of a motor vehicle, and the improvements in the shock absorbing characteristics of engine compartments, have led to the reduction in the likelihood of a driver of a vehicle being killed outright in the event of a front-end collision. With this improved safety in mind, vehicle designers are turning their attention to the improvement in the design of pedal boxes on which the vehicle control pedals are mounted such that in the event of a front-end collision the driver's feet or legs are not trapped or injured by the pedal box or the control pedals associated therewith.

Accordingly, it is a primary objective of the present invention to provide a pedal mounting for a vehicle which collapses in the event of a front-end collision, thereby preventing the driver's legs or feet from becoming trapped or injured.

The Invention

The present invention provides a pedal bracket for mounting one or more control pedals of a vehicle to a pedal box, the pedal bracket comprising: a base plate for mounting onto a surface of the pedal box; at least one shaft support extending from a surface of the base plate which is remote from the pedal box to support a shaft on which one or more of the control pedals are pivotally mounted; a plurality of fasteners provided on the base

plate extending into corresponding through-holes provided in the pedal box thereby anchoring the pedal bracket to the pedal box; and a frangible means engaging with each of the rivets whereby in the event of a front-end impact of the vehicle the frangible means fractures and the sacrificial pedal bracket becomes detached from the pedal box.

Preferably, the frangible means comprises a plurality of sacrificial areas on the base plate of substantially reduced material thickness with respect to the remainder of the base plate, one or more of the fasteners extending from each of the sacrificial areas.

Alternatively, the frangible means may comprise a sacrificial bush surrounding each fastener. The bush may be held in place on the corresponding fastener by an end retainer cap and may be provided with a collar with a diameter greater than that of the through-hole in the pedal box thereby securing the pedal bracket to the pedal box, the collar becoming sheared from the bush in the event of a front-end impact thereby enabling the detachment of the pedal bracket from the pedal box. Preferably, the sacrificial bush is formed from a plastics material.

Additionally, a pyrotechnic charge may be provided between the pedal bracket and the pedal box to actively promote the detachment of the pedal bracket from the pedal box in the event of a front-end impact.

Preferably, each of the fasteners is a rivet.

The pedal bracket is preferably die-cast from a metal, but may also be formed from a plastics material or a ceramic material.

Drawings

Preferred embodiments of the invention are described in detail with reference to the accompanying drawings in which:-

Figure 1 is a side view of a pedal box incorporating a sacrificial pedal bracket in accordance with a first embodiment of the invention;

Figure 2 is a view taken from the front of the sacrificial pedal bracket of Fig. 1, for improved clarity the pedal box does not itself feature in this drawing;

Figure 3 is an exploded side view of the pedal box and sacrificial pedal bracket of Fig. 1 which shows a frangible zone of the pedal bracket and an associated rivet which secures the sacrificial pedal bracket to the pedal box; and

Figure 4 is an exploded side view of a pedal box and a pedal bracket in accordance with a second embodiment of the invention.

Figure 1 illustrates the general arrangement of a pedal box 1 mounted within the passenger compartment 2 of an automobile. The pedal in this instance is a brake pedal 4, but the invention is equally applicable to clutch or accelerator (throttle) pedals. The pedal 4 is pivotally mounted on a pivot shaft 21 which is supported between two shaft supports 20 provided on a sacrificial pedal bracket 10. Depression of the pedal 4 causes movement of a push rod 5 which acts on a brake servo 6 to cause brake actuation in a known manner. The brake servo 6 is mounted on an engine compartment 3 side of a vehicle bulkhead 7, and the pedal box 1 together with the sacrificial pedal bracket 10 are mounted on a passenger compartment side beneath a scuttle cross member 8 which is secured between side walls of the passenger compartment 2. The dash and the steering column of the vehicle are mounted on the scuttle cross member 8.

In the case of a front-end impact of the vehicle, the brake servo 6 and bulkhead 7 are forced towards the driver in the direction of the arrow R_1 and the pedal box 1 collides with the scuttle cross member 8 which does not move substantially in the event of a front-end impact since it is mounted between the side walls of the vehicle. However, this collision of the pedal box 1 with the scuttle cross member 8, together with the inertia of the driver represented by arrow R_2 , imposes a considerable force (hereinafter referred to as the impact force) within the sacrificial pedal bracket 10 and especially at positions on the sacrificial pedal bracket 10 where it is mounted onto the pedal box 1.

Figures 2 and 3 show the sacrificial pedal bracket 10 in more detail. The pedal 4 itself, not shown in Figure 3, is fast to a pedal pivot tube (not shown) which is mounted on the pivot shaft 21 between two shaft supports 20. It is usual for a return spring for the pedal 4 to be wrapped around the pivot tube, although no return spring has been shown in the drawings of this Specification. The shaft supports 20 are provided on a main body 12 of a base plate 11 of the sacrificial pedal bracket 10.

It will be appreciated that in modern vehicle design a single pedal bracket can be used to support both or all of the vehicle operating pedals. Thus although Figures 1 and 2 show only one pedal 4 supported by the sacrificial pedal bracket 10, in practice both or all vehicle pedals could be arranged side by side, each with its own pivot shaft 20 or optionally two pedals being supported on a single pivot shaft 20.

In addition to the main body 12, the base plate 11 is also provided at each corner with a frangible zone 13 and a rivet 14 is provided in each of these frangible zones 13 to mount the sacrificial pedal bracket onto the pedal box 1. Each rivet 14 extends from the frangible zone 13

through a corresponding through-hole provided in the pedal box 1 to engage with the other side of the pedal box thereby securely mounting the pedal bracket 10 to the pedal box 1.

As shown specifically in Figure 3, the frangible zones 13 are of substantially reduced material thickness when compared to the main body 12 of the base plate 11. The frangible zones 13 have been designed such that in the event of a front-end collision, the impact force is sufficient to cause fracturing across each of the zones 13. Accordingly, the main body 12 of the base plate 11 becomes detached from the pedal box 1.

Small protrusions 18 formed on the base plate 11 of the sacrificial pedal bracket 10 cooperate with corresponding recesses 19 formed in the pedal box 1 to help in the location of the pedal bracket 10 when it is mounted onto the pedal box 1.

Figure 4 illustrates a second embodiment of the present invention. In this instance, the base plate 11 of the pedal bracket 10 is of a uniform thickness. As in the previous embodiment, rivets 14' are provided which extend from the base plate 11 into corresponding holes formed in the pedal box 1. However, each of the rivets 14' is surrounded by a plastic sacrificial bush 16 which is held in place by a retainer cap 15 provided on the end of the rivet 14'. The retainer cap 15 has a smaller diameter than that of the through-hole in the pedal box 1. Each of the bushes 16 is provided with a collar 17 which has a diameter that is greater than that of the corresponding through-hole in the pedal box 1. This collar 17 ensures that the pedal bracket 10 is securely mounted onto the pedal box 1. In the event of a front-end collision, the impact force is sufficient to shear the collar 17 from the bush 16 and the pedal bracket 10 thereby becomes detached from the pedal box 1.

It is envisaged that a pyrotechnic charge, such as that used to activate air-bags could beneficially be provided between the pedal bracket 10 and the pedal box 1 of either of the embodiments described above to actively promote the detachment of the pedal bracket 10 from the pedal box 1 in the event of a front-end collision.

Although in the foregoing description of the preferred embodiments rivet are used to secure the pedal bracket 10 to the pedal box 1, it is believed that any other comparable fastener could be equally adapted to the present invention. For example, each rivet could be replaced by a nut and bolt assembly, a self tapping screw or even a clip.

CLAIMS

1. A pedal bracket for mounting one or more control pedals of a vehicle to a pedal box, the pedal bracket comprising:

a base plate for mounting onto a surface of the pedal box;

at least one shaft support extending from a surface of the base plate which is remote from the pedal box to support a shaft on which one or more of the control pedals are pivotally mounted;

a plurality of fasteners provided on or in the base plate extending into corresponding through-holes provided in the pedal box thereby anchoring the pedal bracket to the pedal box; and

a frangible means engaging with each of the rivets whereby in the event of a front-end impact of the vehicle the frangible means fractures and the pedal bracket becomes detached from the pedal box.

2. A pedal bracket according to claim 1, wherein the frangible means comprises a plurality of sacrificial areas on the base plate of substantially reduced material thickness with respect to the remainder of the base plate, one or more of the fasteners extending from each of the sacrificial areas.

3. A pedal bracket according to claim 1, wherein the frangible means comprises a sacrificial bush surrounding each fastener, the fasteners being provided with an end retainer cap to hold the corresponding sacrificial bushes in place, that end of each bush which is remote from the base plate having a collar with a greater diameter than that of the corresponding through-hole in the pedal box thereby securing the pedal bracket to the pedal box, the collar becoming sheared from the bush in the event of a front-end impact enabling the detachment of the pedal bracket from the pedal box.

4. A pedal bracket according to claim 3, wherein the sacrificial collar is formed from a plastics material.

5. A pedal bracket according to any preceding claim, wherein a pyrotechnic charge is provided between the pedal bracket and the pedal box to actively promote the detachment of the pedal bracket from the pedal box in the event of a front-end impact.

6. A pedal bracket according to any preceding claims wherein each fastener is a rivet.

7. A pedal bracket according to any preceding claim which is die-cast from a metal.

8. A pedal bracket according to any of claims 1 to 6 which is formed from a plastics material.

9. A pedal bracket according to any of claims 1 to 6 which is formed from a ceramic material.

10. A pedal bracket according to any of the preceding claims, wherein the frangible means is capable of withstanding a force of up to 1000N.

11. A pedal bracket substantially as hereinbefore described with reference to and as shown in Figures 1 to 3, or Figure 4 of the accompanying drawings.

CLAIMS

1. A pedal bracket for mounting one or more control pedals of a vehicle to a pedal box, the pedal bracket comprising:

a base plate for mounting onto a surface of the pedal box;

at least one shaft support extending from a surface of the base plate which is remote from the pedal box to support a shaft on which one or more of the control pedals are pivotally mounted;

a plurality of fasteners provided on or in the base plate extending into corresponding through-holes provided in the pedal box thereby anchoring the pedal bracket to the pedal box; and

a frangible means engaging with each of the fasteners whereby in the event of a front-end impact of the vehicle the frangible means fractures and the pedal bracket becomes detached from the pedal box.

2. A pedal bracket according to claim 1, wherein the frangible means comprises a plurality of sacrificial areas on the base plate of substantially reduced material thickness with respect to the remainder of the base plate, one or more of the fasteners extending from each of the sacrificial areas.

3. A pedal bracket according to claim 1, wherein the frangible means comprises a sacrificial bush surrounding each fastener, the fasteners being provided with an end retainer cap to hold the corresponding sacrificial bushes in place, that end of each bush which is remote from the base plate having a collar with a greater diameter than that of the corresponding through-hole in the pedal box thereby securing the pedal bracket to the pedal box, the collar becoming sheared from the bush in the event of a front-end impact enabling the detachment of the pedal bracket from the pedal box.

4. A pedal bracket according to claim 3, wherein the sacrificial collar is formed from a plastics material.
5. A pedal bracket according to any preceding claim, wherein a pyrotechnic charge is provided between the pedal bracket and the pedal box to actively promote the detachment of the pedal bracket from the pedal box in the event of a front-end impact.
6. A pedal bracket according to any preceding claims wherein each fastener is a rivet.
7. A pedal bracket according to any preceding claim which is die-cast from a metal.
8. A pedal bracket according to any of claims 1 to 6 which is formed from a plastics material.
9. A pedal bracket according to any of claims 1 to 6 which is formed from a ceramic material.
10. A pedal bracket substantially as hereinbefore described with reference to and as shown in Figures 1 to 3, or Figure 4 of the accompanying drawings.



Application No: GB 0024604.1
Claims searched: 1 - 10

Examiner: Peter Gardiner
Date of search: 7 December 2000

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): B7B: BSBCX, BSBNC, BSDA, BSDB, BSES

Int Cl (Ed.7): B60R: 21/00, 21/02, 21/09
B60T: 7/06
G05G: 1/14

Other: Online: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	EP 0904990 A1 ITT MANUFACTURING (see abstract and figures 1 and 2)	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.